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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,885	01/04/2002	Ichiro Masaki	6515	4792

7590 08/09/2010

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EXAMINER	
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ART UNIT	PAPER NUMBER
2622	

MAIL DATE	DELIVERY MODE
08/09/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/037,885	MASAKI ET AL.	
	Examiner	Art Unit	
	YOGESH K. AGGARWAL	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53 and 59-108* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *17,18,35,36,74,75,90 and 91* is/are allowed.

6)☒ Claim(s) *1-16,19-34,37-53,59-73,76-89 and 92-108* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments with respect to claims 1-53 and 59-108 have been considered but are moot in view of the new ground(s) of rejection. The claims 1-16, 19-34, 37-53, 59-73, 76-89, 92-18 are rejected in view of newly cited reference McCaffrey et al. (US Patent # 6,101,294). Examiner sincerely apologizes for the delay in prosecution.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1,2, 4-16, 19-21, 23, 25-27, 29-34, 37, 39-42, 59-73, 76-78, 80-89, 92, 94-97, 99 and 101 are rejected under 35 U.S.C. 102(e) as being anticipated by McCaffrey et al. (US Patent #6,101,294).

[Claim 1]

McCaffrey teaches a method of adaptively controlling sensitivity, on a pixel-by-pixel basis, of a digital imager (figure 2, col. 5 lines 34-41, imager 201), comprising: (a) determining a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels (col. 6 lines 7-25, intensity corresponding to I3) (b) determining an illumination intensity level mapping function based upon the determined number of pixels within the first defined range of illumination intensity levels (col. 6 lines 7-16); (c) determining a transfer control function based on the determined illumination intensity level mapping function

(col. 6 lines 16-25); and (d) imposing the determined transfer control function upon a pixel of the digital imager (col. 6 lines 16-25, also see col. 6 lines 32-37).

[Claim 2]

McCaffrey teaches determining a number of pixels having illumination intensity levels within a second defined range of illumination intensity levels within a second defined range of illumination intensity level (col. 6 lines 7-21, intensity I2 as shown in figure 1b); said determination an integration time of the transfer control function being determined based on the determined illumination intensity level mapping function (col. 6 lines 16-37).

[Claim 4]

McCaffrey teaches wherein the first defined range of illumination intensity levels is a range of illumination intensity levels including an illumination intensity level representing pixel saturation (see figure 1a, intensity I3).

[Claim 5]

McCaffrey teaches wherein the second defined range of illumination intensity levels is a range of illumination intensity levels including an illumination intensity level representing a minimum illumination intensity level (col. 4 lines 51-59, dark regions).

[Claim 6]

McCaffrey teaches wherein the first defined range of illumination intensity levels is a range of illumination intensity levels including an illumination intensity level representing pixel saturation (see figure 1a, intensity I3). McCaffrey teaches second defined range of illumination intensity levels is a range of illumination intensity levels including an illumination intensity level

representing a minimum illumination intensity level adjusted for a pixel offset value (col. 4 lines 51-59, dark regions).

[Claim 7]

McCaffrey teaches wherein said determination of a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels (intensity I3, figures 1a-1c) determines a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels from a frame of pixels of image data created by the digital imager (col. 6 lines 7-25).

[Claim 8]

McCaffrey teaches wherein said determination of a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels determines a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels from a partial frame of pixels of image data created by the digital imager (col. 6 lines 7-25, only the area corresponding to brightest pixels is analyzed).

[Claim 9]

McCaffrey teaches wherein said determination of a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels determines a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels from a defined area within a frame of pixels of image data created by the digital imager (col. 6 lines 7-25, the whole area is read as a defined area).

[Claim 10]

McCaffrey teaches wherein said determination of a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels determines a number of pixels of image data having illumination intensity levels within a first defined range of illumination intensity levels from a user-defined area within a frame of pixels of image data created by the digital imager (since the user has to press the shutter button in order for the image taking to take place, any frame or area within the frame is considered to be a user defined area).

[Claim 11]

McCaffrey teaches wherein the determined illumination intensity level mapping function is a calculated illumination intensity level mapping function, the calculation being based upon the determined number of pixels within the first defined range of illumination intensity levels (col. 6 lines 7-25).

[Claim 12]

McCaffrey teaches wherein the determined illumination intensity level mapping function is a selected illumination intensity level mapping function selected from a plurality of pre-specified illumination intensity level mapping functions, the selection being based upon the determined number of pixels within the first defined range of illumination intensity levels (col. 6 lines 7-25, figures 1b and 1c and histogram represent different integration times. Different integration times will have different transfer functions).

[Claim 13]

McCaffrey teaches wherein the determined transfer control function is a calculated transfer control function, the calculation being based upon the determined illumination intensity level mapping function (col. 6 lines 7-25, figure 2).

[Claim 14]

McCaffrey teaches, wherein the determined transfer control function is a selected transfer control function from a plurality of pre-specified transfer control functions, the selection being based upon the determined illumination intensity level mapping function (col. 6 lines 7-25, figures 1b and 1c represent different integration times and the histogram in figure 3 represent different intensities. Different integration times will have different transfer functions).

[Claim 15]

The method as claimed in claim 2, wherein the determined transfer control function determines an integration time is a calculated transfer control function, the calculation being based upon the determined illumination intensity level mapping function (col. 6 lines 7-25).

[Claim 16]

McCaffrey teaches wherein the determined transfer control function determines an integration time is a selected transfer control function from a plurality of pre-specified transfer control functions, the selection being based upon the determined illumination intensity level mapping function (col. 6 lines 7-25).

[Claim 19]

McCaffrey teaches wherein the illumination intensity level mapping function is determined independently of the determination of the integration time (histogrammer 204 determines an intensity level function and transfer function is generated by function generator 206).

[Claim 20]

McCaffrey teaches that the number of pixels that correspond to a mapping function and are above or below a particular threshold is dependent thereupon an integration time (col.6 lines 7-26).

[Claim 21]

McCaffrey teaches wherein the illumination intensity level mapping function i.e. the number of pixels corresponding to an intensity level is determined prior to the determination of the integration time (col. 7-25).

[Claim 23]

McCaffrey teaches wherein determinations of the illumination intensity level mapping function and the integration time are determined substantially simultaneously (col. 5 lines 34-41 real time).

[Claim 25]

McCaffrey teaches further comprising: (d) determining, for each of a plurality of defined ranges of illumination intensity levels (figures 1b and 1c has different intensity levels), a number of pixels within the defined range of illumination intensity levels when the determined number of pixels within the first defined range of illumination intensity levels is above a first threshold; and (e) determining, for each defined range of illumination intensity levels, an illumination intensity level mapping function based upon the determined number of pixels within the defined ranges of illumination intensity levels (col. 6 lines 7-25, figures 1a-1c and figure 2).

[Claim 26]

McCaffrey teaches a method of adaptively controlling sensitivity, on a pixel-by-pixel basis, of a digital imager, comprising: (a) determining a plurality of numbers of pixels, each determined number of pixels being a number of pixels within an associated defined range of illumination intensity levels (col. 6 lines 7-25, figure 2 and see figures 1b and 1c for corresponding illumination levels); (b) determining a plurality of illumination intensity level mapping functions, each determined illumination intensity level mapping function corresponding to one defined range of illumination intensity levels, each illumination intensity level mapping function being determined based upon the determined number of pixels within an associated defined range of illumination intensity levels (col. 6 lines 7-25); (c) determining a transfer control function based on the plurality of determined illumination intensity level mapping functions; (col. 6 lines 7-25); and (d) imposing the determined transfer control function upon a pixel of the digital imager (col. 7 lines 7-25)

[Claims 27, 29, 30]

These claims are similar to claims 2, 5 and 6 respectively. Therefore they have been analyzed and rejected based upon claims 2, 5 and 6.

[Claims 31-34]

These claims are similar to claims 7-10 respectively. Therefore they have been analyzed and rejected based upon claims 7-10.

[Claim 37]

McCaffrey teaches a method of adaptively controlling sensitivity, on a pixel-by- pixel basis, of a digital imager, comprising: (a) determining a number of saturated pixels; (b) selecting a first illumination intensity level mapping function when the determined number of saturated pixels is

above a first threshold (col. 6 lines 7-25, figure 2 and see figures 1b and 1c) (c) determining a number of pixels having illumination intensity levels within a defined range of values; (d) selecting a second illumination intensity level mapping function when the determined number of pixels is below a second threshold (e) determining a transfer control function based on the selected illumination intensity level mapping function and (f) imposing the determined transfer control function upon a pixel of the digital imager (See Col. 5 line 55-col. 6 line 25).

[Claim 39]

McCaffrey teaches wherein said determination of the number of pixels having illumination intensity levels within a defined range of values determines the number of pixels when the determined number of saturated pixels is below a first threshold (col. 6 lines 7-25, figure 2).

[Claim 40]

McCaffrey teaches determining a number of pixels having illumination intensity levels within a second defined range of illumination intensity levels and determining number of pixels having illumination intensity levels within a second defined range of illumination intensity levels; said determination of the transfer control function being determined based on the determined illumination intensity level mapping function and the determined integration time (col. 7 lines 7-25)

[Claim 41]

This is a combination of claims 1, 2, 4 and 5 respectively. Therefore it has been analyzed and rejected based upon claims 1, 2, 4 and 5.

[Claim 42]

McCaffrey teaches wherein the transfer control function comprises a plurality of discrete transfer control functions (figures 1b and 1c would have different transfer control functions).

[Claims 59-73, 76-78, 80-89, 92, 94, 95, and 96, 97, 99, 101]

These are apparatus claims corresponding to method claims 1, 2, 4-16, 19-21,23, 25-27, 29-34, 37, 39-42 respectively and are therefore analyzed and rejected based upon method claims1, 2, 4-16, 19-21,23, 25-27, 29-34, 37, 39-42.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3, 22, 24, 28, 43-47, 79, 98, 100 and 102 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCaffrey et al. (US Patent # 6,101,294).

[Claims 3 and 28]

It is noted that it is within the skill of an ordinary person i.e. the user of the camera to repeat the method (a) - (d) until a desired dynamic range is realized.

[Claims 22 and 79]

McCaffrey fails to teach wherein the illumination intensity level mapping function is determined after the determination of the integration time. However Official notice is taken that it is very well known to have determined illumination intensity level mapping function is determined after the determination of the integration time in order to reduce the load on the processor. Therefore taking the combined teachings of McCaffrey and Official Notice, it would be obvious to one

skilled in the art at the time of the invention to have been motivated to have determined illumination intensity level mapping function is determined after the determination of the integration time in order to reduce the load on the processor.

[Claims 24, 98, 100, 102]

McCaffrey teaches at least three transfer functions corresponding to two different intensity levels (figures 1b and 1c has different intensity levels). However it would be a matter of design choice to set the number of transfer functions as eight wherein the number of illumination intensity level mapping functions to select from is eight in order to suitably adjust the exposure time for a particular scene.

[Claims 43-45]

McCaffrey teaches at least three discrete transfer functions corresponding to two intensity levels (figures 1b and 1c). However it would be a matter of design choice to set the number of transfer functions as eight wherein the number of illumination intensity level mapping functions to select from is eight in order to suitably adjust the exposure time for a particular scene.

[Claims 46-47]

McCaffrey teaches said determination of each of discrete transfer control function being determined based on the plurality of determined illumination intensity level mapping function (col. 6 lines 33-54).

6. Claims 38, 52, 53, 93, 107, 108 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCaffrey (US Patent # 6,816,200) in view of Gallagher et al. (US Patent # 6,765,611).

[Claim 38]

McCaffrey fails to teach wherein the first illumination intensity level mapping function represents a greater compression of the resolution of the high illumination intensity levels of the scene than the second illumination intensity level mapping function.. However Gallagher wherein the saturated pixels are compressed with a higher error corresponding to high illumination intensity levels of the scene than the second illumination intensity level (col. 9 line 64-col. 10 line 10). Therefore taking the combined teachings of McCaffrey and Gallagher, it would be obvious to one skilled in the art at the time of the invention to have been motivated to have the saturated pixels are compressed with a higher error corresponding to high illumination intensity levels of the scene than the second illumination intensity level in order to set the compression differently.

[Claim 52]

McCaffrey teaches a method of adaptively controlling sensitivity, on a pixel-by- pixel basis, of a digital imager, comprising: (a) selecting a first illumination intensity level mapping function; (b) determining a first transfer control function based on the selected first compression; (c) imposing the determined first transfer control function upon a pixel of the digital imager; (d) determining a histogram of illumination intensity levels of pixels of image data being generated by the digital imager having the determined first transfer control function imposed thereon; (e) determining an illumination intensity level maximum, the illumination intensity level maximum representing a greatest illumination intensity level for a pixel in a sample forming the histogram; (f) determining a second illumination intensity level mapping function, based on the determined intensity level maximum, the second illumination intensity level mapping function preventing the generation of any saturated pixels and providing a dynamic range of image data enabling

each level in the histogram to be realized by the digital imager; (g) determining a second transfer control function based on the determined second illumination intensity level mapping function; and (h) imposing the determined second transfer control function upon a pixel of the digital imager (col. 6 lines 50-col. 7 line 25, figures 1-3). McCaffrey fails to teach wherein the transfer control function is based on selected first compression. However Gallagher wherein the saturated pixels are compressed with a higher error corresponding to high illumination intensity levels of the scene than the second illumination intensity level (col. 9 line 64-col. 10 line 10). Therefore taking the combined teachings of McCaffrey and Gallagher, it would be obvious to one skilled in the art at the time of the invention to have been motivated to have the saturated pixels are compressed with a higher error corresponding to high illumination intensity levels of the scene than the second illumination intensity level in order to set the compression differently.

[Claim 53]

Gallagher teaches that the first illumination intensity level mapping function represents a greater compression of the resolution of the high illumination intensity levels of the scene than the second illumination intensity level mapping function (col. 9 line 64-col. 10 line 10).

[Claims 93, 107, 108]

These are apparatus claims corresponding to method claims 38, 52, 53 respectively and are therefore analyzed and rejected based upon method claims 38, 52, 53.

7. Claims 48-51 and 103-106 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCaffrey (US Patent # 6,816,200) in view of Kindt et al. (US Patent # 6,348,681).

[Claims 48 and 49]

McCaffrey fails to teach wherein each discrete illumination intensity level mapping function is a linear illumination intensity level mapping function. However Kindt teaches wherein illumination intensity incident light intensity is a linear function (fig. 4). Therefore taking the combined teachings of McCaffrey and Kindt, it would be obvious to one skilled in the art at the time of the invention to have been motivated to have a linear illumination intensity level mapping function in order to extend the dynamic range of the sensor.

[Claim 50]

Kindt teaches wherein the plurality of discrete linear illumination intensity level mapping functions form a composite piece-wise linear illumination intensity level mapping function, the composite piece-wise linear compression being the determined illumination intensity level mapping function, the determined illumination intensity level mapping function being a nearly logarithmic illumination intensity level mapping function (figure 4).

[Claim 51]

Kindt teaches wherein the eight discrete linear illumination intensity level mapping functions form a composite piece-wise linear illumination intensity level mapping function, the composite piece-wise linear compression being the determined illumination intensity level mapping function, the determined illumination intensity level mapping function being a nearly logarithmic illumination intensity level mapping function (figure 4).

[Claims 103-106]

These are apparatus claims corresponding to method claims 48-51 respectively and are therefore analyzed and rejected based upon method claims 48-51.

Allowable Subject Matter

8. Claims 17, 18, 35, 36, 74,75, 90 and 91 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOGESH K. AGGARWAL whose telephone number is (571)272-7360. The examiner can normally be reached on M-F 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yogesh K Aggarwal/
Primary Examiner, Art Unit 2622